UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/517,178	12/07/2004	Katsuaki Abe	MAT-8631US	5688

23122 7590 05/06/2008

RATNERPRESTIA
P O BOX 980
VALLEY FORGE, PA 19482-0980

EXAMINER	
MATTIS, JASON E	
ART UNIT	PAPER NUMBER
2616	

MAIL DATE	DELIVERY MODE
05/06/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/517,178	ABE ET AL.	
	Examiner	Art Unit	
	JASON E. MATTIS	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 February 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to the Amendment field 2/7/08. Due to the amendment, the previous claim objection has been withdrawn. Claims 1-24 are currently pending in the application.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-7 and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Krishnamoorthy et al. (U.S. Pat. 6490270 B1).

With respect to claim 1, Krishnamoorthy et al. discloses a method of transmitting data on a burst signal basis **(See the abstract of Krishnamoorthy et al. for reference to transmitting data on a frame basis, which is a burst signal basis)**. Krishnamoorthy et al. also disclose inserting a data symbol having a higher modulation level and a data symbol having a lower modulation level partially on a symbol basis based on a communication control information into a transmission burst formed at

transmission **(See column 4 lines 9-38, column 6 line 66 to column 7 line 17, and Figures 2 and 4 of Krishnamoorthy et al. for reference to inserting symbols, including symbols having a higher modulation level as well as symbols having a lower modulation, such as 8-PSK, 16-QAM, 32-QAM, and 64-QAM, on a symbol basis into a transmission frames at formed at transmission based modulation determining control information)**. Krishnamoorthy et al. further discloses that the higher modulation level has more modulation levels than the lower modulation level **(See column 4 lines 17-38 of Krishnamoorthy et al. for reference to using a modulation level such as 64-QAM as a higher modulation level and using a modulation level such as 8-PSK as a lower modulation level, where 64-QAM has more modulation levels than 8-PSK)**. Krishnamoorthy et al. also discloses that the control information is information known by the receiver that is for determining the modulation level on respective data symbols **(See the abstract and column 4 lines 45-56 of Krishnamoorthy et al. for reference to inserting control training sequences into the preambles of time slot with the training sequences being known by a receiver and used by the receiver to determine the modulation level of respective data symbols of the time slots)**. Krishnamoorthy et al. further discloses transmitting the transmission burst including data symbol having the higher modulation level and the data symbol having the lower modulation level **(See the abstract, column 6 line 66 to column 7 line 18, and Figure 4 of Krishnamoorthy et al. for reference to transmitting frames including both higher modulation symbols and lower modulation symbols)**.

With respect to claim 2, Krishnamoorthy et al. discloses a method of receiving data on a burst signal basis **(See the abstract of Krishnamoorthy et al. for reference to a receiver receiving data transmitted on a frame burst basis)**. Krishnamoorthy et al. also discloses detecting a data symbol in response to respective symbol positions where a data symbol having a higher modulation level and a symbol having a lower modulation level being inserted in the burst signal received are placed based on a communication control information for determining a modulation level based on respective data symbols and known to a transmitter **(See column 4 lines 45-56, column 5 line 47 to column 10 line 65, and Figure 3 of Krishnamoorthy et al. for reference to using a correlation result to detect the position of symbols in a frame having higher modulation levels and the position of symbols in the frame having lower modulation levels inserted into the frame based on time slot preamble training sequences, which are communication control information, used to determine symbol modulation levels and known to the transmitter)**.

With respect to claim 3, Krishnamoorthy et al. discloses a transmission device of a communication system that carries out communication on a burst basis by digital modulation **(See the abstract of Krishnamoorthy et al. for reference to a wireless communication system including a transmitter transmitting data on a frame burst basis)**. Krishnamoorthy et al. also discloses a means for dividing transmission data at a given ratio **(See column 4 lines 17-37 and Figure 2 of Krishnamoorthy et al. for reference to dividing transmission data into packets at a given ratio according to selected modulation schemes for each time slot)**. Krishnamoorthy et al. further

discloses a first and second mapping means providing a first divided data with a signal space diagram according to a first modulation method and a second divided data with a signal space diagram according to a second higher modulation method respectively **(See column 6 line 66 to column 7 line 17 and Figure 4 of Krishnamoorthy et al. for reference to a means for modulating a first portion of data to be transmitted in a frame according to a first modulation scheme as well as a means for modulating a different portion of data to be transmitted in the frame according to a second higher level modulation scheme)**. Krishnamoorthy et al. also disclose a multiplexing means placing symbols modulated by the first and second modulation method at given places respectively and multiplexing a transmission burst **(See column 3 line 61 to column 4 line 44 and Figure 2 of Krishnamoorthy et al. for reference to multiplexing symbols of time slots having data modulated by the first and second modulation methods respectively into given positions of the same transmission frame)**. Krishnamoorthy et al. further discloses that the mapping is based on communication control information known to a receiver for determining a modulation level on respective data symbols **(See the abstract and column 4 lines 45-56 of Krishnamoorthy et al. for reference to mapping symbols to a data frame based on time slot preamble training sequences, which is communication control information, used to determine symbol modulation levels for the symbols of the frame and known to the receiver)**.

With respect to claim 4, Krishnamoorthy et al. discloses a reception device of a communication system that carries out communication on a burst basis by digital

modulation **(See the abstract of Krishnamoorthy et al. for reference to a receiver receiving digitally modulated data transmitted on a frame burst basis in a wireless communication system)**. Krishnamoorthy et al. also discloses a reception means for receiving a communication signal then outputting a bust signal **(See column 5 lines 47-67 and Figure 3 of Krishnamoorthy et al. for reference to receiving a signal and outputting a demodulated signal based on the received signal)**. Krishnamoorthy et al. also discloses a dividing means dividing the burst signal received **(See column 4 lines 17-37 and Figure 2 of Krishnamoorthy et al. for reference to dividing a received frame in given time slots based on modulation schemes used in the different time slots)**. Krishnamoorthy et al. further discloses that the dividing is based on communication control information known to a transmitter for determining a modulation level on respective data symbols **(See the abstract and column 4 lines 45-56 of Krishnamoorthy et al. for reference to mapping symbols to a data frame based on time slot preamble training sequences, which is communication control information, used to determine symbol modulation levels for the symbols of the frame and known to the transmitter)**. Krishnamoorthy et al. also discloses a first and second symbol detecting means providing a first divided signal with symbol detection in response to a first modulation method and a second divided signal with symbol detection in response to a second higher level modulation method respectively **(See column 5 line 47 to column 6 line 65 and Figure 3 of Krishnamoorthy et al. for reference to detecting different time slot symbols according to both a first modulation scheme and a second higher level modulation scheme)**.

Krishnamoorthy et al. also discloses a multiplexing means for placing symbols detected by the first and second symbol detecting means in a given order and multiplexing a reception data stream **(See column 3 line 61 to column 4 line 44 and Figure 2 of Krishnamoorthy et al. for reference to placing different time slot symbols modulated according to different modulation schemes in a proper order according to a transmitted multiplex data frame)**.

With respect to claims 5 and 6, Krishnamoorthy et al. discloses that the communication control information is information representing when communication quality is different at each data symbol position, a place where the data symbol having a higher modulation level is inserted is assigned to a symbol position of which communication quality is considered in advance better than other symbol positions **(See column 1 lines 48-57, column 6 line 66 to column 7 line 17, and Figure 4 of Krishnamoorthy et al. for reference to determining the communication channel quality for each time slot of a frame and for reference to placing symbols having a higher level modulation scheme in time slots determined in advance to have better channel quality)**.

With respect to claim 7, Krishnamoorthy et al. discloses a communication quality information obtaining means obtaining information about whether communication quality is different at each data symbol position in the burst **(See column 1 lines 48-57 of Krishnamoorthy et al. for reference to monitoring communication quality for each symbols of each time slot)**. Krishnamoorthy et al. also discloses an insertion place detecting means for assigning based on the difference in communication quality,

a place where a symbol modulated by the second modulation method to a data symbol position of which communication quality is better than other symbol positions **(See column 6 line 66 to column 7 line 17 and Figure 4 of Krishnamoorthy et al. for reference to placing symbols having a higher level modulation scheme in time slots of a frame determined to have better channel quality based on channel quality parameters)**.

With respect to claim 12, Krishnamoorthy et al. discloses inserting known bit data in a part of the data symbol having a higher modulation level so that a signal space diagram at a modulation is limited **(See column 4 line 57 to column 5 line 46 of Krishnamoorthy et al. for reference to inserting known sequences to be detected by a correlator in order to determine the modulation scheme used so that the signal space diagram is limited to those known sequences and corresponding modulations)**.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 8, 9, and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krishnamoorthy et al. in view of Murakami et al. (U.S. Pat. 6993092 B1).

With respect to claim 8, Krishnamoorthy et al. discloses a communication quality information measuring means measuring communication quality at each data symbol position in the burst **(See column 1 lines 48-57 of Krishnamoorthy et al. for reference to monitoring communication quality for each symbols of each time slot)**. Krishnamoorthy et al. also discloses an insertion place information obtaining means for obtaining information about a place where the data symbol having the higher modulation level is inserted **(See column 5 line 47 to column 6 line 65 and Figure 3 of Krishnamoorthy et al. for reference to detecting the time slot symbol positions of different modulation schemes including schemes having a higher modulation level)**. Although Krishnamoorthy et al. does disclose using communication quality information to determine what modulation scheme to use for different symbols, Krishnamoorthy et al. does not specifically disclose a reception device including a notifying means notifying a transmission device of information about a measured communication quality.

With respect to claim 9, Krishnamoorthy et al. discloses a communication system comprising a reception device **(See the abstract of Krishnamoorthy et al. for reference to a wireless communication system including a receiver)**. Krishnamoorthy et al. also discloses a transmission device including a communication quality information obtaining means obtaining information about reception quality **(See**

column 1 lines 48-57 of Krishnamoorthy et al. for reference to a transmission devices monitoring channel quality). Krishnamoorthy et al. further discloses the transmission device including an insertion place detecting means for assigning an insertion place to a symbol position of which communication quality is better than another symbol position based on the reception quality information **(See column 6 line 66 to column 7 line 17 and Figure 4 of Krishnamoorthy et al. for reference to assigning symbols using different modulation schemes to different positions based on the obtained channel quality information)**. Although Krishnamoorthy et al. does disclose using communication quality information to determine what modulation scheme to use for different symbols, Krishnamoorthy et al. does not specifically disclose a reception device including a notifying means notifying a transmission device of information about a measured communication quality.

With respect to claims 8 and 9, Murakami et al., in the field of communications, discloses a reception device including a measuring means to measure reception quality at each symbol position of a received burst and a notifying means notifying a transmission device of information about the measured communication quality **(See column 3 lines 27-58, column 5 lines 34-41, and Figures 1 and 5 of Murakami et al. for reference to a receiver measuring transmission path distortion of symbols of a received signal and for reference to signaling transmission path distortion to a transmitter)**. Using a reception device including a measuring means to measure reception quality at each symbol position of a received burst and a notifying means notifying a transmission device of information about the measured communication

quality has the advantage of providing a means for a transmitter to receive communication channel quality information about data received by a receiver.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when presented with the work of Murakami et al., to combine using a reception device including a measuring means to measure reception quality at each symbol position of a received burst and a notifying means notifying a transmission device of information about the measured communication quality, as suggested by Murakami et al, with the system and method of Krishnamoorthy et al., with the motivation being to provide a means for a transmitter to receive communication channel quality information about data received by a receiver.

With respect to claims 13-16, Krishnamoorthy et al. does not specifically disclose estimating reception quality of a signal received using a vector of the signal inserted on a symbol basis received at a symbol position of a higher modulation level placed away by a given Euclidean distance in response to an amplitude of a symbol of a lower modulation method.

With respect to claims 13-16, Murakami et al. discloses estimating reception quality of a signal received using a vector of the signal inserted on a symbol basis received at a symbol position of a higher modulation level placed away by a given Euclidean distance in response to an amplitude of a symbol of a lower modulation method **(See column 5 lines 13-41 and Figures 3-4 of Murakami et al. for reference to estimating reception quality using a signal point layout of a known pilot symbol vector inserted on a symbol basis where a symbol of higher modulation**

is placed away from a symbol of lower modulation by to a given distance according to a signal point layout). Estimating reception quality of a signal received using a vector of the signal inserted on a symbol basis received at a symbol position of a higher modulation level placed away by a given Euclidean distance in response to an amplitude of a symbol of a lower modulation method has the advantage of providing a means to measure signal quality of received data modulated according to different modulation schemes.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when presented with the work of Murakami et al., to combine estimating reception quality of a signal received using a vector of the signal inserted on a symbol basis received at a symbol position of a higher modulation level placed away by a given Euclidean distance in response to an amplitude of a symbol of a lower modulation method, as suggested by Murakami et al, with the system and method of Krishnamoorthy et al., with the motivation being to provide a means to measure signal quality of received data modulated according to different modulation schemes.

6. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krishnamoorthy et al. in view of Moon et al. (U.S. Publication US 2003/0021240 A1).

With respect to claims 10 and 11, Krishnamoorthy et al. does not specifically disclose superimposing partial redundant data to be retransmitted to a position of a symbol having a higher modulation level and correcting an error by outputting a

redundant section deleted at the coding through another channel, storing the deleted section and supplying the redundant section stored for superimposing the retransmitted partial data.

With respect to claims 10 and 11, Moon et al., in the field of communications, discloses superimposing partial redundant data to be retransmitted to a position of a symbol having a higher modulation level and correcting an error by outputting a redundant section deleted at the coding through another channel, storing the deleted section and supplying the redundant section stored for superimposing the retransmitted partial data **(See page 3 paragraph 21 to page 4 paragraph 27 and Figure 5 of Moon et al. for reference to transmitting partial redundant data at a higher modulation rate and combining received partial redundant data with stored deleted data of the originally transmitted data)**. Superimposing partial redundant data to be retransmitted to a position of a symbol having a higher modulation level and correcting an error by outputting a redundant section deleted at the coding through another channel, storing the deleted section and supplying the redundant section stored for superimposing the retransmitted partial data has the advantage of allowing data errors to be efficiently corrected through data retransmission.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when presented with the work of Moon et al., to combine superimposing partial redundant data to be retransmitted to a position of a symbol having a higher modulation level and correcting an error by outputting a redundant section deleted at the coding through another channel, storing the deleted section and supplying the

redundant section stored for superimposing the retransmitted partial data, as suggested by Moon et al, with the system and method of Krishnamoorthy et al., with the motivation being to allow data errors to be efficiently corrected through data retransmission.

7. Claims 17-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krishnamoorthy et al. in view of Shahar et al. (U.S. Publication US 2003/0002495 A1).

With respect to claims 17, 19, 21, and 23, Krishnamoorthy et al. does not specifically disclose generating a transmission packet which outputs information about a size of the packet and detecting a quantity and insertion place of a symbol having a higher modulation level based on the information about a size of the transmission packet for controlling data separation.

With respect to claims 18, 20, 22, and 24, Krishnamoorthy et al. does not specifically disclose that the information about the packet size is inserted in the transmission burst.

With respect to claims 17-24, Shahar et al., in the field of communications, discloses generating a transmission packet which outputs information about a size of the packet and detecting a quantity and insertion place of a symbol having a higher modulation level based on the information about a size of the transmission packet for controlling data separation **(See page 1 paragraphs 13-14, page 7 paragraphs 62-63, and Figures 3 and 4 of Shahar et al. for reference to a data stream being divided into data packets 220 containing a header 240 including information about a modulation type 300 and a length 310 of a data field 250 and for reference to a**

receiver using the information about the modulation type and the length to reconstruct a packet by determining a quantity and insertion place of data having a higher modulation level). Generating a transmission packet which outputs information about a size of the packet and detecting a quantity and insertion place of a symbol having a higher modulation level based on the information about a size of the transmission packet for controlling data separation has the advantage of allowing more customization of transmitted data for more efficient transmission of data by allowing for different packet data lengths.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when presented with the work of Shahar et al., to combine generating a transmission packet which outputs information about a size of the packet and detecting a quantity and insertion place of a symbol having a higher modulation level based on the information about a size of the transmission packet for controlling data separation, as suggested by Shahar et al, with the system and method of Krishnamoorthy et al., with the motivation being to allow more customization of transmitted data for more efficient transmission of data by allowing for different packet data lengths.

Response to Arguments

8. Applicant's arguments filed 2/7/08 have been fully considered but they are not persuasive.

Regarding Applicant's argument that Krishnamoorthy et al. does not disclose insertion of high modulation symbols and low modulation symbols on a symbol by symbol basis, as claimed, the examiner respectfully disagrees. As shown in the rejections above, Krishnamoorthy et al. discloses transmitting data in a frame burst structure (See the abstract, column 3 line 64 to column 4 line 16, and Figure 2 of Krishnamoorthy et al.). Each frame is comprised of a number of time slots that further comprise a number of symbols. Krishnamoorthy et al. also discloses inserting symbols having both a higher modulation level and a lower modulation level into the same data frame (See the abstract of Krishnamoorthy et al.). Thus Krishnamoorthy et al. discloses inserting a data symbol having a higher modulation level (i.e. 64-QAM) and a data symbol having a lower modulation level (i.e. 8-PSK) into a transmission burst (a data frame), as claimed in claim 1. Since consecutive symbols of the same frame forming different time slots are inserted using different modulation levels, these symbols are inserted on a symbol by symbol basis, as claimed. Thus, Krishnamoorthy does disclose insertion of high modulation symbols and low modulation symbols on a symbol by symbol basis.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON E. MATTIS whose telephone number is (571)272-3154. The examiner can normally be reached on M-F 8AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Firmin Backer can be reached on (571)272-6703. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JEM

/FIRMIN BACKER/
Supervisory Patent Examiner, Art Unit 2616